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CONTROL, R-4
(Annual Report, 1946)

April 1, 1947

Chief, Forest Service
Washington, D. C.

Dear Sir:

The highlights of the insect situation for the year 1946 were (1) rapid build-up and spread of the epidemics on two spots previously reported--one on the Caribou and the other on the Teton, and (2) the sudden build-up of an epidemic in lodgepole pine on the Bear River on the Wasatch National Forest.

The Caribou infestation has spread to all mature lodgepole stands north of Caribou Mountain on the Caribou Forest and in addition it has jumped to the Heise, Swan Valley and Victor districts on the Targhee where 31,000 new attacks are reported.

The Teton infestation has spread northward for 15 to 20 miles to Grand Teton National Park. It is estimated that there are 30,000 new attacks extending through the lodgepole stands from Pritchard Creek and northerly to Wilson where the mature lodgepole type is largely discontinued. The type is resumed near Grand Teton National Park.

The Bear River infestation reached epidemic stage during the year.

1. Mountain Pine Beetle (D. Monticolae Hopk.)

a. Ashley

The build-up in lodgepole pine on the north side of the Ashley is not excessive, but there is a continued build-up. New attacks in 1944 were estimated to include 6,200 trees; in 1945, 9,270 trees, and in 1946, 12,200 trees. No control work was done in 1946. A survey of sufficient intensity and detail should be made next fall to give data needed to determine control needs. A flight over the area indicates that there are scattered trees and groups of trees dying over several square miles in Upper Sheep Creek, Smith's Fork, Sage Creek, Henrys Fork, and Hoops Lake.

b. Bridger

There has been little or no control work on the Bridger for several years, but there is some spread into the Bailey Creeks from the adjoining Prichard-Fall Creek epidemic on the Teton. The bugs appear to be in an endemic stage on the remainder of the Forest. The Forest estimated that 250 trees should be treated on the Bailey Creeks.

c. Cache

The Forest treated 328 trees during the year and estimates that 120 new attacks should be treated this spring. The largest hot spot treated contained 13 trees. All bug trees are being found on the two Idaho districts, Preston and Paris, which are nearest the Caribou infestation.

d. Caribou

The Caribou treated 699 trees on Anderson Creek last spring in attempts to prevent southward spread of the Brookman-Clear Creek infestation. Lack of funds prevented any efforts to whip out the entire infestation on this forest.

This infestation has now increased to an estimated 150,000 new attacks on the Caribou alone. Host types are scattered and patchy but the aerial survey and ground checks indicate that all host types are infested north of Caribou Mountain and Anderson Creek and extending northeasterly onto the Heise, Swan Valley and Victor Districts on the Targhee. The prevailing winds during flight season are toward the northeast and the principal spread is in this direction. Whether or not the prevailing winds are causing the spread to the northeast is unknown, but the spread to the south of Caribou Mountain where host types are as plentiful as to the northeast is much slower.

The 1946 attacks were very heavy. In addition to hitting the mature and overmature trees the bugs hit pole stands of young vigorous trees very heavily. It is doubtful that broods will mature in many of the young, thin-barked trees. There is little host timber remaining on the north end of the Caribou so we expect additional spread to the Targhee and southward on the Caribou this year.

If the large deficiency appropriation is received in time for work this spring it is planned to treat about 5,000 trees near the forest boundary along the Snake River in Swan Valley and about 3,000 south of Caribou Mountain. Both areas will have to be treated

again in the fall and for an additional year or two to give us any chance of success.

e. Minidoka

Since the larger treating jobs of the 1930's the Minidoka has been treating a small number of trees each year. The forest is now apprehensive of four small local infestations. About 500 trees are in need of treatment.

f. Teton

The Fall-Prichard Creek epidemic has spread northward to Wilson where the host types pinch out for about five miles, there being only a few lodgepole trees on private lands along the Snake River in this five-mile interval. Surveys made last fall indicate that we now have 30,000 new attacks from Prichard Creek and northerly to Wilson. About 1,000 new attacks are reported on and adjacent to the Grand Teton National Park. Undoubtedly these attacks are coming from the Teton National Forest epidemic.

g. Targhee

The 31,000 new attacks on the Heise, Swan Valley and Victor Districts of the Targhee are undoubtedly from the Caribou as the fall survey indicates very few 1945 attacks on the Targhee.

The few bug trees reported on the Big Springs District in our previous report have been treated.

h. Wasatch

The Rock Creek-Fish Creek epidemic is spreading slowly into the Granddaddy Lake Basin and into Squaw Basin. This very slow spread within the drainage has characterized this epidemic over the 14-year period that it has been under observation. There has been no spread out of the drainage and into adjacent areas. Dr. Wygant of the Bureau of Entomology and Plant Quarantine suggests that we make an annual survey to determine the progress and spread of this infestation. He lists three courses of action from which we may choose: (1) Treat and eliminate the outbreaks; (2) open the area for logging and remove the host material within and immediately adjacent to the infestation; or (3) permit the infestation to run its course, sacrifice the potential wood products within the primitive area, and hope that the infestation will not spread into other areas. The first alternative cannot be undertaken now. Lack of roads, the rough terrain and difficulties in connection with getting sufficient labor make the job formidable. The area is in a primitive area so that

roads and logging operations are not in harmony with primitive area policy. It is doubtful that we could interest anyone in a sale on the area if cutting and roads should be permitted. For the next year it appears that our only choice is to follow the third alternative and check on the infestation by annual survey.

The serious build-up on the Bear River at the forest boundary on the north end of the Wasatch has resulted from controlled burning on privately owned lands on the Bear River. Burning is done annually early in the fall to improve grazing. As can be expected, the newly scorched lodgepole attracted the insects and proved easy prey to their attacks. The epidemic is centered on four sections of land supporting scrubby lodgepole. About half of the land is privately owned and upon which control will be necessary. About 6,800 new attacks were found in our fall survey. There are 2.2 new attacks per acre on the private lands and .92 per acre on the national forest lands.

Three other localised areas on the north side of the Wasatch showing new attacks are: Blacks Fork - 240 new attacks on 2,092 acres or .11 per acre; East Fork - 280 new attacks on 2,030 acres or .13 per acre; Smiths Fork - .08 per acre. If the deficiency appropriation of \$30,000 is made for the Wasatch job we will aim to treat the above three areas with the Bear River job.

1. Other Forests

Other forests have nothing to report.

2. Black Hills Beetle (*B. ponderosae* Hopk.)

a. Ashley

About 1,029 ponderosa pine trees were treated on the Ashley in the spring of 1946. All were on the north side except for 86 trees treated near Lake Fork Mountain on the south side. A good job was done on the area treated on the north end, but our aerial and ground surveys of last fall indicate that we have 488 infested trees scattered to the west of the spring-treated area. These should be treated this spring if funds are made available as they constitute an immediate threat to all ponderosa pine extending in a narrow belt to the eastward. This spring an additional block of timber is being advertised in this ponderosa pine belt. The type is being selectively cut-over as rapidly as markets are found.

The last treating done on the Lake Fork District prior to 1946 was in 1937. The Forest noted an increase in new attacks in 1943 with

a larger increase in 1944. New attacks decreased in 1945 and 1946. Our survey last fall indicated 571 new attacks on 12,600 acres. The Forest feels that some control should be done this spring if funds are made available. If funds are made available treating should be done on the Lake Fork District this spring.

Tests made last spring with treatment of ponderosa pine with ortho indicated that the treatment is very successful. We will treat with ortho this spring if funds are made available. This extends our spring treating season in ponderosa pine to the period of first emergence in July. Tests made on two or three trees using DDT were not too encouraging, but certainly not conclusive. There had been some emergence by mid-August, but the beetles remaining appeared sluggish and it is possible that the chemical may affect them after emergence.

b. Dixie

1. Dixie Division

Although this division is considered to be in endemic stage several small groups of infested trees were noted in 1946. A small amount of control now will be economical and we concur with the Forest that it should be done this spring if funds are made available. Our needs were made known to you in our letter of 12/20/46.

2. Powell Division

No treating on this division has been done during the past two years. Ground reconnaissance failed to show any build-up or new attacks in groups. Our experience with air reconnaissance last fall was so favorable, however, that we plan to extend it and have a good look at the Dixie Forest from the air this year.

c. Fishlake

The Fishlake has a small infestation in ponderosa pine on Deep Creek and Beaver Canyon, but it is reported to be decreasing. The timber is scattered and inoperable. Since no other timber is threatened and since the infestation is on the wane we do not plan any control measures.

3. Engelmann Spruce Beetle (D. engelmanni Hopk.).

a. Dixie

Our fall survey showed a two to one reduction in the infestation since the previous year. Apparently the 1945 control work together with the great amount of clean-up by woodpeckers has materially reduced

this infestation. The survey indicated new attacks to the extent of .1 tree per acre. Very few vigorous trees were attacked in 1946. Many attacks were reattacks of trees attacked and weakened in 1945.

About 80 infested trees were cut on the Mitchell and Nelson sale area in 1946. All slabs were burned currently. Ranger Bentley reported a considerable number of attacks in logs during the summer along with considerable beetle activity in the slab pile. The slabs were burned. Since the beetles are attracted to new cutting it appears that with current slab disposal we are getting considerable reduction in the beetle population. An additional sale on the area has just been awarded. We feel that the situation warrants treating a number of stumps and trees this spring to supplement control by timber sale and woodpeckers. See our letter of 12/20/46.

Control work on the Cedar Breaks National Monument appears to be very thorough. With the values at stake on this monument as well as our 45 million board feet of Engelmann spruce timber on the Dixie it is planned to keep a close check on this infestation by both this office and the Bureau of Entomology and Plant Quarantine. We will certainly want to prevent the residual beetle population from building to epidemic proportions again if possible.

A great deal of credit is due Ranger Bentley and the local Forest force in getting on top of this beetle infestation.

b. Fishlake

A small infestation was found on the Chappell Bros. timber sale on Thousand Lake Mountain on June 21, 1946.

The spruce bark beetle infestation is small and confined to the sale area. Since the infestation is confined to the sale area most of the control will consist of current disposal of slabs and trap logs. Some stump spraying may be needed but it is not yet indicated.

In checking old insect reports for the Fishlake it was noted that the Forest reported that 80 trees were found in 1928. The report states that "they were used for lumber and the slabs burned."

The spruce timber on this district is infested with a mealybug which appears to be lowering the vigor of the trees and making them susceptible to attack by bark beetles.

4. Other

Field examinations and discussions were held on the ground at Cedar Breaks National Monument, Bryce Canyon National Park and on the

Dixie National Forest in August by National Park officials, members of this office and the Dixie Forest, and Dr. Wygant of the Bureau of Entomology and Plant Quarantine. Engelmann spruce beetle control work was thoroughly discussed. It was agreed that the infestation had been greatly reduced by woodpeckers and control operations.

We examined many clumps of dying alpine fir trees at Cedar Breaks and found that many are apparently being killed by root diseases among which the most common is probably Armellaria. No doubt some of the trees killed by Dryocoetes confusus were first weakened by the root disease. Even though some healthy trees were killed by this insect it appears that we can now safely state that root diseases are a primary cause of alpine fir losses on the Cedar Breaks National Monument and the surrounding Dixie National Forest. Previously the loss had been attributed substantially to work of Dryocoetes confusus.

The Park Service sprayed white fir (Abies concolor) stands along the main road in Bryce Canyon National Park with DDT to control the needle miner, Epinotia meritana Heinrich, last spring. The spring spraying was not successful, but it is reported that Chief Ranger Fagergren has successfully sprayed against this insect in a late summer test, using hand spray equipment. Mounted power spray equipment was used in the spring tests.

Our joint conferences with the Bureau of Entomology and the Park Service men have proved profitable and very satisfactory. They have served to give each an understanding of the mutual problems as well as of the limitations as to courses of action each can take regarding insect control as well as to coordinate control measures.

Mr. James C. Evenden of the Bureau of Entomology and Plant Quarantine directed an experiment in the use of DDT mixtures of 3 to 5 per cent as repellents to insect attacks in the heart of the Fall Creek infestation on the Teton last June. The experiment showed considerable promise. No doubt Mr. Evenden will experiment further along these lines and furnish us with some interesting conclusions. If the DDT treatment finally proves reliable as a repellent we may be able to give protection to valuable trees on camp and picnic grounds, at ranger stations, summer homes, lodges, or along roads while an epidemic passes, subsides or is being controlled.

The infestation of mealybug, Puto sp. continues on Thousand Lakes Mountain on the Fishlake. Very little can be done to control the bugs but the infestation is localized and the area is being cut-over and the timber used. The greatest damage is to the residual stand. Both clear cutting and selection cutting is being practiced on the area, depending on the maturity of the stands. The "leave" trees are probably weakened by the bugs, but since this is the first insect infestation of its kind observed we are unable to predict its outcome or effects on the "leave" stands.

5. Aerial Reconnaissance.

The use of aerial reconnaissance was undertaken on a substantial scale in the Region last fall. The following forests were flown: Caribou, northwest part of Bridger, Targhee, Teton, Ashley and Wasatch. We have the following comments to make:

Type of Plane

Our Region 4 Stinson Voyager 150 plane was used and flown by our regular pilot, Claire Hartnett. The plane is a four-place, high wing monoplane of 150 H. P., single motor. From the standpoint of visibility this plane is very good as there are no low wing structures to limit the view. Our pilot, who has had considerable experience in mountain flying, is reluctant to carry more than one observer in the rougher areas. Even though the plane is four-place he feels that a load such as Ranger Millard, 210 pounds, and E. H. Clocker, 225 pounds with parachutes, is the maximum that should be taken and flights then confined to the more gentle terrain. We agree with him that with only the single engine of 150 H. P. we should do most of our flying with only one observer. We will then have sufficient reserve power to get out of tight places, buck down-drafts and meet other emergencies. In training our local field forces as observers we can stay with the safer terrain and work the rougher country after the training officer is no longer needed and only the local observer is carried. Our pilot, Mr. Hartnett, rapidly developed into an observer and proved very valuable. He is intensely interested in the work and helped immensely in picking out details which might be missed by a single observer.

Costs

Our costs were about \$10 per hour of flying time. Costs included gasoline, oil, hangar service and pilot's salary and per diem expenses. The total cost of flying the forests listed was about \$300.

Organization of Work.

All overnight stops were made where hangar service was had. For late fall flying it is believed necessary to keep the plane in a hangar when not in use, not only to preserve the plane but also to keep snow, ice and sleet off of it. Ice, snow and sleet must be removed from the plane before taking off. We would have lost two or three days of flying had the plane been allowed to stand out.

Each day's work was carefully planned so that definite areas could be completed on each flight and so that it was unnecessary to "deadhead" over areas already carefully covered in getting to or from an outlying area. Each drainage containing host type was

carefully worked by going up the drainage to the upper reaches of the type and then returning down the drainage on the opposite side. With the pilot observing we obtained a double check on each side on each round trip through the drainage. Where more observations were needed we repeated the trip. In abrupt canyons we found it safest to eliminate the trip up the drainage. We came into the upper end of the drainage at a safe elevation and then throttled down and lost elevation as we flew down the canyon. Speed could be reduced and added stability obtained by lowering the flaps.

Trees were spotted and notes made directly on forest base maps as observed. Available type maps were used. Knowledge of the timber types from ground experience was valuable. The flights were plotted directly on the base map as they progressed. When we were uncertain as to causes of redtops or sorrel tops we plotted the area for ground check.

It was found that we could make the best observations between 10 a.m. and 3 p.m. in October and November. The early morning and late afternoon shadows made accurate work difficult. It is especially important to cease work by 3 p.m. as the observer becomes fatigued and no longer does good work. Good observation requires great concentration and attention to details. Five hours of this is about all that should be undertaken each day.

After a little experience we could determine porcupine killed trees by the barked upper boles and limbs. Some spring sun scald could also be determined. We, however, listed most of the spots for field check until we are more experienced in this work.

For reasons of safety we are limited to flying not closer than 500 feet to the terrain. We found that we could observe fully as well and better in many cases by staying 1,000 feet or more above the terrain. Certainly it was not necessary to fly so low as to "look each tree in the face" in order to obtain valuable and reliable data. We were happy to have the added margin for safety which the higher flying provided.

Additional matters of safety adhered to and important in this work are: (1) Care in flying up canyons to prevent getting the plane in a blind pocket in which a turn is difficult or impossible; (2) care in flying in canyons or over rough terrain while fall snow or rain squalls are prevalent. These tend to close in suddenly and must be watched to prevent being trapped; (3) care in straining gasoline through a chamois skin or equivalent when taking on gasoline from barrels, cans or any container other than a gasoline

pump at an airport. Our pilot observed all safety measures with scrupulous care. In addition he, without fail, personally checked over the plane each day, drained sediment bulbs, checked for leaking gas and oil lines and cared for anything indicating maintenance needs.

Coniferous species can be distinguished after some training and experience, but in pioneering work we found it necessary to plot some areas for ground check which we probably would not need to do after we have had more experience. It is advantageous to know something of local types before attempting any aerial observations.

Objectives of Aerial Reconnaissance

Aerial reconnaissance was undertaken to determine just what we could see and analyze from the air. We wanted to know if we could "point up" our ground surveys by first getting a look from above. We wanted to check areas already covered by ground surveys to determine whether or not the ground survey party had seen all areas of sorrel or redtops.

Results of Aerial Reconnaissance.

Our results are very encouraging and we plan to continue use of planes for this work. The Army Search and Rescue Unit stationed at nearby Hill Field has several planes which they use in training and search and rescue work. It is planned to accompany army personnel in training flights over our forests to compare use of their planes for insect observations with our Stinson 150 Voyager. Following are some notes applying to specific forests:

Targhee

Aerial reconnaissance showed that we had an infestation on the Heise, Swan Valley and Victor Districts. We were able to delineate it from the air and furnish a guide to the ground party which proved very reliable. The spread of the infestation from the Caribou was clearly evident from the air. We spotted many areas showing singles, doubles, and small patches of red and sorrel tops which were unknown to ground observers.

Ranger Millard of the Big Springs District has treated several scattered trees north of Shotgun Valley. Aerial reconnaissance served to dispel any apprehension that he had not covered the area thoroughly with control.

Teton

Aerial reconnaissance showed that we had bugs in all our host stands between Prichard Creek and Wilson. We needed to know whether or

not the infestation was spreading to the east of the Snake River. We have found that we cannot always rely on finding infestations while they are small by ranger observations during the field season. Some areas are just not visited or seen in sufficient detail during the fall months to spot infestations while they are small and easy to control. We mapped all suspicious spots east of the Snake even though we were pretty certain the trees were damaged or killed by porcupines, scald or other agencies of destruction. Such areas were then visited on the ground which gave us a good check on our air determination of cause of death. Only one bug tree was found east of the Snake, so we were reasonably certain that the infestation is still confined to the types west of the river. With the vast areas to cover on the ground east of the Snake we could never be certain that the bugs were not in there from an extensive ground survey, but six to eight hours of flying with the follow-up ground checks did give us valuable information upon which we could place considerable reliance.

Wasatch

The Wasatch Forest had already made their ground survey when the aerial reconnaissance was made. The focal point of the epidemic was charted from the air and the cause of the build-up indicated. One of our top insect men was in charge of the ground survey but missed an area on private lands which was very hard to spot on the ground. Following the aerial reconnaissance the survey party was returned to the field and the delineated area surveyed. It meant raising our estimate of new attacks from about 3,000 to over 6,000. Without the additional information a control project would have ended disastrously.

Our aerial look at the Rock-Fish Creek area confirmed the ground survey finding of the extent of that infestation.

Ashley

The aerial reconnaissance showed that the control measures of last spring in ponderosa pine on the north side of the Forest had missed some scattered trees to the southwest. Our present ground survey shows that we have 488 trees which should be treated to clean up the north side of this forest.

General Comments

While we have no intention of going off the deep end in thinking that aerial bug reconnaissance is the final answer to catching infestations while they are small and easily controlled, nevertheless we are considerably encouraged to continue use of aerial observations. With the rising costs of control, difficulty in

getting men, etc., we feel that we must try more flying to help in spotting our insect areas while they are small and more cheaply and easily controlled. \$300 to \$400 spent on ground surveys will not cover much territory, but this amount of money will go a long way in getting an ^{aerial} look at our forests so that we can point up our ground checks.

6. Conclusions:

At present we have no money for insect control for the remainder of this fiscal year. There has been considerable correspondence with your office and with Regions 1 and 2 regarding proposed control projects on the Caribou, Targhee, Teton, and Wasatch. Discussions have been held in joint meetings with the Bureau of Entomology and Plant Quarantine, the National Park Service, the supervisors of the forests involved and Regions 1, 2, and 4. While we are awaiting the outcome of a deficiency appropriation of \$300,000 we are making plans to handle this job. The final planning meeting will be held in Ogden on Thursday, April 3. Mr. Evenden and Dr. Wygant of the Bureau of Entomology and Plant Quarantine will attend. If the full amount is not forthcoming to do this job we will probably need to consider dropping the Wasatch job and possibly the Caribou job and concentrate on the Teton and Targhee. The appropriation should be continuing so we can continue work into July. We will be hard-pressed to obtain sufficient labor and possibly ortho to do this job. Certainly we will need every day we can work in July prior to the 1947 flight in order to do this job. The same areas will need to be covered again in the fall and each fall for two to four years.

Other projects which we will undertake this spring if funds are made available in April are as follows in order of priority:

Ashley - Black Hills beetle - \$3,000 - Manila District
on north side.

Dixie - Engelmann spruce beetle - \$1,000
Black Hills beetle - \$1,500

In addition we have the following situations which we are unable to attempt to control because of lack of funds, labor, equipment and overhead:

Ashley - Mountain pine beetle in lodgepole - 12,200 trees

Wasatch - " " " " " 40,000 "
(Rook-Fish Creek)

Ashley - Black Hills beetle - Lake Fork District (South side)
571 trees.

Our report would not be complete without mentioning the fine cooperation we are receiving from the Bureau of Entomology and Plant Quarantine. Mr. Evenden and Dr. Wygant have contributed much of their time to a mutual attack on the insect problems in this Region.

Very truly yours,

W. B. RICE, Regional Forester

By

F. W. Godden



Addenda

April 2, 1947

On March 31 advantage was taken of a trip over Southern Utah by the Army Air Rescue Detachment stationed at Hill Field to have a check of insect conditions on the Dixie and Fishlake National Forests. E. H. Clocker of Timber Management and Lowell Farmer of Information and Education accompanied the flight as observers. Farmer served as a ranger for eight years on the old Powell National Forest. During that period he conducted several insect surveys and control projects on the forest, thus he served well as an observer on this flight.

The flight was made in a C47 plane equipped with observation blisters on each side of the fuselage back of the wings. Observation from the blisters and the pilot's compartment was good. We cannot expect the Army to take time to make detailed reconnaissance of areas we wish to see, but their flights do aid us in getting a preliminary look at a forest from which it can be determined whether or not a detailed aerial reconnaissance with our plane is needed.

We were able to make a number of deductions from observations on this trip: (1) The spruce beetle infestation on Thousand Lake Mountain on the Fishlake Forest is localized and confined to the timber sale area where control measures are being taken; (2) The spruce beetle infestation on the Dixie appears to be as indicated by the ground survey of last fall; (3) The Black Hills bark beetle in ponderosa pine appears to be under control and in an endemic stage on the Dixie and old Powell. The beetle-killed ponderosa pine killed in previous years stand out in sharp contrast to the few scattered red tops killed recently.

Major Keck who commands the Army Air Rescue Detachment at Hill Field, is anxious that his unit be of maximum use to us to the full extent of his authority. We will accompany more flights in the future where such flights extend over forests which we want to see.

INSECT CONTROL SUMMARY

SUMMARY

2-4

REPRODUCED FROM

Year	Name of Unit	Forest	Duration of Project (incl. dates)	Tree Species Affected	Insect Responsible	Method Followed	Acres Treated	Trees Treated	Per- cent Trees Killed	Expenditures					Total Cost per Tree	Total Cost per Acre	Oil Used Gal. per Tree	No. Man Days Used	Percent Reduction Obtained
												P & M	Cost. Time & Expenses	Total Cost of Project					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1945	Cache		5/14-7/25/45	P. contorta	D. monticolae	Fell & burn	4,420	539	100			994.70	378.20	1,312.70	2.44	.30	0	149	
"	Caribou		1/1 -10/31/45	"	"	"	3,000	8,180	100			25,806.93	2,175.00	37,341.93	4.56	12.46	1.90	4056	
"	Dixie		5/15-6/15/45	P. ponderosa	D. ponderosae	Fell & burn	600	257	100			1,212.00	19.00	1,231.00	4.79	2.05	0	172	
"	"		6/11-7/21/45	P. engelmanni	D. engelmanni	Ortho	1,820	4,661	1			4,232.00	207.00	4,439.00	.97	2.47	1.00	377	
1946	Ashley		5/23 to 7/10	P. ponderosa	D. ponderosae	Fell & burn. Ortho	8,520	1,029	100			7,860.48	222.00	8,082.48	7.85	.95	1.78	589	
"	Cache		5/16 to 6/28	P. contorta	D. monticolae	Fell & burn	10,440	328	100			979.20	121.00	1,100.20	3.35	.11	-	150.5	
"	Caribou		June	"	"	Ortho	90	699	40			1,683.53	-	1,683.53	2.40	18.70	1-1/2	123	
"	Minidoka		"	"	"	"		200											
"	Thurgess		6/17 - 6/28	"	"	" and few peeled	Spots	127	100			150.00	86.28	236.28	1.86	-	.75	25	

REMARKS:

INSECT CONTROL SUMMARY

CACHE NATIONAL FOREST

Year	Name of Unit	Forest	Duration of Project (Incl. dates)	Tree Species Affected	Insect Responsible	Method Followed	Acres Treated:	Trees Treated	Percent Trees Killed (1c)	Expenditures					Total Cost per Tree	Total Cost per Acre	Oil Used Gal. per Tree	No. Man Days Used	Percent Reduction Obtained
										P & M	Cont. Time & Expenses	Total Cost of Project							
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1943		Cache	11/8 to 11/10	P. contorta 1st	D. punctatus	Fell and burn	20	55	100			50.00	25.00	75.00	1.36	3.75	1.0	8	
1944	Trail Hollow-Pearl Creek		10/8 to 10/31/44	"	"	"	6,000	190	100			260.12	67.60	327.72	1.72	0.546	-	40	
1944	Willow Springs. Green Basin. Paris Flat		10/14 to 11/28/44	"	"	"	2,200	97	100			247.68	20.00	267.68	2.75	.1216	"	32	
1945	Trail Hollow - Pearl Creek	"	6/15-6/27/45	"	"	"	1,000	130	100			226.94	65.76	292.70	2.27	.029	None	30	
"	Copenhagen	"	7/14-7/25/45	"	"	"	250	174	100			256.00	120.00	376.00	2.16	1.44	"	41	
"	North Canyon	"	5/14-7/28/45	"	"	"	1,300	126	100			153.56	117.00	270.56	2.15	.21	"	34	
"	Paris Flat	"	6/15-7/2/45	"	"	"	1,500	70	100			225.00	36.44	261.44	3.73	.17	"	33	
"	Miles Canyon	"	6/14-6/20/45	"	"	"	150	39	100			71.00	19.00	90.00	2.31	.31	"	11	
							8,420	539	100			934.50	378.20	1,312.70	2.44	.30	0	149	
	* Scattered trees. ** 3-mile hike to area																		
1946	Eightmile	Cache	6/19-6/28/46	"	"	"	440	17	100			55.20	0	55.20	3.25	.125	0	8.5	
"	Paris Flat	"	5/16-6/28/46	"	"	"	2,000	37	100			172.00	20.00	192.00	5.19	.09	0	26	
"	Green Basin	"	5/16-6/28/46	"	"	"	2,000	45	100			253.00	25.00	278.00	6.18	.14	0	38	
"	North Canyon	"	5/16-6/28/46	"	"	"	1,500	57	100			180.00	15.00	195.00	3.77	.13	0	28	
"	Stauffer	"	5/16-6/28/46	"	"	"	500	23	100			44.00	20.00	64.00	2.78	.13	0	8	
"	Skinner - Coop	"	5/16-6/28/46	"	"	"	4,000	156	100			275.00	40.00	315.00	2.04	.06	0	42	
								324				579.20	121.00	1,100.20	3.35			150.5	

REMARKS:

INSECT CONTROL SUMMARY

CARBON NATIONAL FOREST

Year	Name of Unit	Forest	Duration of Project (incl. dates)	Tree Species Affected	Insect Responsible	Method Followed	Acres Treated	Trees Treated	Percent Trees Killed	Expenses				Total Cost per Tree	Total Cost per Acre	Oil Used Gal. per Tree	No. Man Days Used	Percent Reduction Obtained		
										P & H	Cont. Time & Expenses	Total Cost of Project								
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	
1940	Battlesnake Basin	Caribou	6/4 to 6/12/40	L. P.	D. monticola	Burned standing with oil and killed and burned	100	149	40			-	109.42	109.42	.734	1.094	3/4	28	90	Controlled
1944	Clear Creek-Brockman		9/9 to 12/31/44	"	"	Ordnance, Burn, Fall	640	1,291 132 2,280 3,703	100 100 100			11,222.99	1,036.79	12,259.78	3.31	19.16	1-1/2	1,051	20	
1945	Clear Creek - Brockman	"	1/1 - 10/31/45	"	"	"	3,000	8,180	90			35,206.95	2,175.00	37,381.95	4.96	12.46	1-1/2	4,056	64%	
1946	Anderson Gulch	Caribou	June 1946	"	"	"	90	699	40			1,683.53	0	1,683.53	2.40	18.70	1-1/2	123	0	Area not cleaned up

REMARKS:

INSECT CONTROL SUMMARY

MINIDOKA NATIONAL FOREST

Year	Name of Unit	Forest	Duration of Project (Incl. dates)	Tree Species Affected	Insect Responsible	Method Followed	Acres Treated	Trees Treated	Percent Trees Killed (10)	Expenditures				Total Cost of Project	Total Cost per Tree	Oil Used Gal. per Tree	No. Man Days Used	Percent Reduction Obtained
											P & H	Cont. Time & Expenses						
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
1942	Cassia Division	Minidoka	7/10 - 7/15	L. P.	D. monticolae	Ortho		59	None				19.50	19.50	.33	-	Oil on hand and no record	-
"	Sublett Division		"	"	"	"		44	100				46.00	46.00	1.05	-	Maint.	-
1943	Ecklund Compartment - Burley-Oakley Working Circle		July	"	"	Ortho - Oil	4	19	100			32.00	2.00	34.00	1.78	6.55	1-1/2	4-1/4
1943	Coal Pit Compartment - Burley-Oakley Working Circle		"	"	"	"	8	35	100			57.00	4.00	61.00	1.74	7.62	1-1/2	7-1/4
1943	Basin Patch Compartment - Burley-Oakley Working Circle		"	"	"	"	2	16	100			28.00	2.00	30.00	1.88	15.00	1-1/2	3-1/4
1943	1st & 2nd Fork Compartment - Burley-Oakley Working Circle		"	"	"	"	4	20	100			32.00	5.47	37.47	1.87	9.37	1-1/2	"
1943	Cottonwood Compartment - Burley-Oakley Working Circle		"	"	"	"	6	24	100			40.00	2.00	42.00	1.75	7.00	1-1/2	5-1/4
1943	Sawmill Compartment - Burley-Oakley Working Circle		"	"	"	"	8	40	100			60.00	10.94	70.94	1.77	6.87	1-1/2	9
1943	Cottonwood Compartment Cotton Ridge Point Burley-Oakley Working Circle		October	"	"	Saved by local mill. Burned and peeled chips	2	21	100			-	2.73	2.73	.13	1.36	-	-
1943	Cottonwood Compartment South Bostetter Burley-Oakley Working Circle		December	"	"	Decked and burned	6	79	100			176.00	9.46	185.46	2.35	30.90	27	-
1943	Lever Rock Creek		July	"	"	Ortho - Oil	5	27	100			-	44.00	54.00	2.00	10.80	1-1/2	9
Total 1943								281				25.00	32.50	57.50	1.75			
* No survey made in 1942 to secure check on percent of reduction obtained.																		
1944	Cottonwood Compartment		May	L.P.	"	Decked & burned	30	111	100			467.00	-	467.00	4.20	15.56	-	74
1944	1st and 2nd Fork Comp.		June	"	"	"	40	123	100			327.00	-	327.00	2.65	8.18	-	29
1944	Ecklund & Basin Patch Comp.		June	"	"	Ortho treatment	50	175	100			595.00	-	595.00	3.11	20.90	1.9	50
1944	Sawmill & Trapper Comp.		July	"	"	"	30	116	100			752.00	-	752.00	6.48	25.06	1.7	88
1944	Badger Gulch-Trout Comp.		9-19 to 10/25/44	"	"	Decked & burned	10	85	100			284.00	-	284.00	3.10	25.40	-	24
1944	Coal Pit Compartment		10-25 to 11/14/44	"	"	"	15	52	100			156.00	-	156.00	3.00	20.40	-	16
1944	Wahlatrus Hollow		June	"	"	Decked & burned		2	100									
						Ortho treatment		24	100			40.00	33.00	73.00	2.99	-	240	8
1944								544						2,584.00				
1944								60										
1944								200										

REMARKS: 1942 - All infected trees found were treated.

INSECT CONTROL SUMMARY

TARGHEE N. P.

Year	Name of Unit (2)	Forest (3)	Duration of Project (Incl. Dates) (4)	Tree Species Affected (5)	Insect Responsible (6)	Method Followed (7)	Area Treated (acres) (8)	No. Trees Treated (9)	Per Cent: Trees Killed (10)	Expenditures: Proj. Fund: Cont. Fund: and of Project (11)	Total Cost: Total Cost of Project per Tree (12)	Total Cost: Total Cost per Acre (13)	Oil Used: Gal. per Tree (14)	No. Men: Days Used (15)	Per Cent Reduction Observed (16)	Results (17)	
1928	Targhee Forest	Targhee	5/19-5/7	Lodgepole Pine	Dendroctonus Monticolae	Burning-stand- ing.	1650	3079	6	1,243.03	618.06	1,861.09	.60	1.12	.403	185	70
1929	Targhee Forest (Cottonwood, et al)	Targhee	5/13-5/28	Lodgepole Pine	"	Burning-stand- ing	22600	31204	0	13,745.53	2,722.77	15,468.30	.527	.73	.595	1550	73
1930	Targhee Forest (Cottonwood, et al)	Targhee	4/29-6/23	Lodgepole Pine, Limber Pine	"	Burning-stand- ing	57945	30055	5	23,055.00	5,381.00	28,436.00	.346	.418	.753	1690	80
1931	Targhee Forest (Dry Creek, et al)	Targhee	10/1-11/5 5/6-7/10	Lodgepole Pine and Limber Pine	"	Burning-stand- ing	8740 102570	3671 32315	5 18.5	2,247.56 35,905.00	1,244.54 6,555.38	3,492.10 42,571.47	.951 1.317	.40 .413	1.02 1.6	340 4335	90
1932	Targhee Forest (Victor and Swan Valley Districts)	Targhee	5/15-5/20	Lodgepole Pine.	"	Burning-stand- ing	5900	559	11.8	218.04	1,205.54	1,423.57	1.45	.12	1.3	119	99
1946	Heise, Swan Valley & Big Springs	Targhee	6/17 to 6/28	"	"	Sell & spray with ortho. Peel few	Spots	127	100	150.00	86.28	236.28	1.86		.75	25	Large % of control area not recommended for re-treatment. Fall survey 1932 showed 41% increase on forest as a whole.
1946	Heise, Swan Valley and Big Springs	"	6/17-6/28	"	"	Sell and spray-ortho peel few	Spots	127	100	150.00	86.28	236.28	1.86		.75	25	

% reduction approximated for the area treated each year; area treated was greatly enlarged each year from 1928 to 1931, incl., so the reduction shown is less than the reduction on areas treated 2 or more successive years. The 1932 control work was on D6 and D8 on the South half of the forest, where the first control work was done in 1928. The 1932 project resulted in complete control on the South half of the forest. On the North half of the forest the infested area increased in extent each year but on a large % of the area treated the infestation was controlled in 2 seasons and on a smaller % in one season.

* Number spotted same as number treated.